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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,943

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Jurgen Rabe

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EXAMINER

BASS, DIRK R

ART UNIT

PAPER NUMBER

1797

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/527,943	<b>Applicant(s)</b> RABE ET AL.	
	<b>Examiner</b> DIRK BASS	<b>Art Unit</b> 1797	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 November 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 28-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

Applicant's response filed November 2, 2009 is acknowledged. Claims 1 and 18 are amended, claims 24-27 are cancelled, and claims 28-31 are newly added. Claims 1-23 and 28-31 are pending and further considered on the merits.

#### *Response to Amendment*

In light of applicant's amendment, the examiner modifies the grounds of rejection set forth in the office action dated May 1, 2009.

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-16, 18-23, and 28-31** are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Bensimon et al., US 5840862 (Bensimon).

3. Regarding claim 1, Bensimon discloses a method for arranging a polymer molecule on a support (abstract) comprising:

- a. Providing a substrate having a surface (see "support", col. 1, l. 48-54 and col. 3, l. 5-7);
- b. Providing a surface layer on said surface of the substrate, said substrate and said surface layer providing a support (col. 3, l. 8-12);
- c. Placing a polymer molecule on said surface layer in a first position (col. 3, l. 24-26); and
- d. Adsorbing the polymer molecule on said surface layer providing an adsorbed state of the polymer molecule, the polymer molecule having a first conformation on said surface layer (col. 3, l. 46-50); wherein said surface layer is configured to adjust predefined molecular interaction between the polymer molecule and said support to allow fixing of the first conformation of said polymer molecule (col. 3, l. 54-61), and in said adsorbed state of the polymer molecule

dislocating at least part of the polymer molecule across said surface layer relative to said support by an external force (see “meniscus” col. 4, l. 6-7 and fig. 6).

4. Regarding claim 2, Bensimon discloses a method comprising a step for subsequently fixing the polymer molecule on the surface layer (col. 4, l. 8-10).
5. Regarding claims 3-4, Bensimon discloses a method comprising a step of dislocating in said adsorbed state the polymer molecule across said surface layer by manipulation of said first conformation ('random conformation') of the polymer molecule to a second conformation ('aligned conformation') different from the first conformation of the polymer molecule (col. 4, l. 2-7), and fixing the polymer molecule on the surface layer in said second conformation by means of said molecular interaction between the polymer molecule and said support (col. 4, l. 8-10).
6. Regarding claim 5, Bensimon discloses a method further comprising a step of configuring said surface layer to provide a force required for dislocating the polymer molecule across said surface layer (col. 3, l. 54 – col. 4, l. 10). It is inherent that the force is smaller than about 2 nN due to the fact that the surface layer and substrate claimed (claims 19-21) are the same as those disclosed in Bensimon (see rejections of claims 19-21 below) and that the same materials inherently possess the same properties.
7. Regarding claim 6, Bensimon discloses a method, wherein the step of providing said surface layer on said surface of said substrate comprises a step of forming further binding sites in said surface layer (col. 5, l. 64 – col. 6, l. 3).
8. Regarding claim 7, Bensimon discloses a method, wherein said external force comprises an attractive force provided at least partly by said further binding sites in said surface layer (implicitly disclosed in col. 5, l. 64 – col. 6, l. 3).
9. Regarding claim 8, Bensimon discloses a method, wherein said surface layer is self assembling (col. 6, l. 25-30).
10. Regarding claim 9, Bensimon discloses a method, wherein said step for providing said surface layer on said surface of said substrate comprises a step for using a Langmuir-Blodgett technique or a self organized film technology (col. 6, l. 25-30).

11. Regarding claim 10, Bensimon discloses a method, wherein the method further comprises a step for altering said predefined molecular interaction between the polymer molecule and said support (col. 3, l. 54 - col. 4, l. 10).
12. Regarding claim 11, Bensimon discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for placing said surface layer with the polymer molecule provided thereon into a liquid medium (col. 3, l. 54-61).
13. Regarding claim 12, Bensimon discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for drying said surface layer with the polymer molecule provided thereon (col. 3, l. 54-61 and fig. 6).
14. Regarding claim 13, Bensimon discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for changing a temperature of said surface layer (see "temperature variation", col. 12, l. 6-26).
15. Regarding claim 14, Bensimon discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for applying an electric field oriented at a certain angle with respect to said surface of said support (see "electrophoresis", col. 12, l. 6-26).
16. Regarding claim 15, Bensimon discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for exciting the polymer by light (col. 2, l. 1-3, and fig. 1).
17. Regarding claim 16, Bensimon discloses a method, wherein said external force is provided by using one of the following electric fields: electrical field, magnetic field, optical field, and mechanical field, or any combinations thereof (see "passage of meniscus", col. 4, l. 6-7).
18. Regarding claims 18 and 28-31, Bensimon discloses a method, wherein the polymer molecule comprises a polynucleotide such as DNA or RNA, a polypeptide such as protein, an antibody or antigen-antibody system, a polysaccharide, or a desired mixture of biomolecules (col. 3, l. 24-30).
19. Regarding claim 19, Bensimon discloses a method, wherein said surface layer comprises an inorganic polymer, an organic polymer, an organic low molecular

substance, a metal, a metal oxide, a sulfide, a semiconductor, or an optical element, or any combinations thereof (col. 3, l. 8-12).

20. Regarding claim 20, Bensimon discloses a method, wherein said substrate is atomically flat (see “mica”, col. 3, l. 14). It is inherent that mica is formed of atomically flat sheets of silicate material.

21. Regarding claim 21, Bensimon discloses a method, wherein said substrate comprises glass, surface oxidized silicon, gold, molybdenum sulfide, highly oriented pyrolytic graphite or mica (col. 3, l. 13-14).

22. Regarding claim 22, Bensimon discloses a method, wherein the method comprises a step for anchoring at least one end of the polymer molecule to said support (col. 3, l. 24-26).

23. Regarding claim 23, Bensimon discloses a method, wherein the method comprises a step for anchoring at least one end of the polymer molecule to be arranged to a fiber, a micro-particle, or a nano-particle (col. 3, l. 16-21).

***Claim Rejections - 35 USC § 103***

24. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

25. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bensimon in view of Shu et al., “Extremely Long Dendronized Polymers: Synthesis, Quantification of Structure Perfection, Individualization, and SFM Manipulation”, *Angewandte Chemie*, Vol. 113, no. 24, pgs. 4802-4805 (2001) (Shu).

26. Bensimon fails to explicitly disclose a method wherein the external force is a scanning probe microscope. However, Shu discloses a method, wherein said external force is provided by using one of the following fields: electrical field, magnetic field, optical field, and mechanical field, or any combinations thereof (see “scanning force microscopy” in Shu, pg. 4803).

27. At the time of invention, it would have been obvious to a routineer in the art to modify the method of Bensimon to use the scanning force microscopy manipulation step of Shu since all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in

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their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

### ***Response to Arguments***

28. Applicant's arguments filed November 2, 2009 have been fully considered but they are not persuasive.

29. Applicant's argue that it would not have been obvious to combine Bensimon and Shu to obviate the use of scanning force microscopy to manipulate biomolecules on a support. The examiner disagrees and refers applicant to the appropriate rejections set forth above. Applicants claim a method for manipulating a biomolecule. Shu discloses manipulating polymers via SFM methods. Applicants fail to recite that claim 17 is a method of specifically manipulating DNA or RNA, thereby allowing the teachings of Shu to be applicable to applicant's current claim 17. Moreover, applicants fail to specifically recite the composition of a biomolecule within claim 17.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIRK BASS whose telephone number is (571) 270-7370. The examiner can normally be reached on Mon - Fri (9am-4pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DRB/  
Dirk R. Bass

***/Angela Ortiz/  
Supervisory Patent Examiner, Art Unit 1797***